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**Spicola et al.**

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- (54) **INSERT FOR AN OPENING IN A COMPOSITE MATERIAL PRESSURE VESSEL**
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(\*) Notice: This patent issued on a continued prosecution application filed under 37 CFR 1.53(d), and is subject to the twenty year patent term provisions of 35 U.S.C. 154(a)(2).

Under 35 U.S.C. 154(b), the term of this patent shall be extended for 0 days.

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- (52) U.S. Cl. .... **220/586; 220/62.22; 220/560.04; 220/592; 220/644; 220/661**
- (58) Field of Search ..... **220/560.04, 640, 220/645, 651, 661, 676, DIG. 23, 584, 585, 586, 587, 588, 589, 590, 592, 582, 581, 62.22, 644**

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(57) **ABSTRACT**

A pressure vessel insert comprises a plate having an outboard surface and an inboard surface interconnected by outer edge surfaces, and defining an aperture extending therethrough from the outboard surface to the inboard surface. The plate is provided with a modulus of elasticity within about 30% of a first modulus of elasticity of inboard and outboard skins of a wall portion of the pressure vessel shell around an opening in which the insert is disposed, in directions through the thickness of the skins.

**16 Claims, 3 Drawing Sheets**

